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INTERNATIONAL ASSOCIATION OF PROVIDERS OF AIDS CARE

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Postgraduate Institute for Medicine
Household food aid and nutrition education are associated with improved adherence to HIV antiretroviral therapy: Evidence from Honduras

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Overview of presentation

• Background and motivation
• Intervention and study design
• Results
• Implications
Food insecurity and malnutrition associated with poor ART outcomes…

- Food insecurity is the limited or uncertain availability of nutritionally adequate, safe foods
- Key barrier to adherence and retention in care
- Associated with poorer HIV biologic outcomes (immune response, viral suppression)
  - Low adherence may be one pathway
…prompting increasing support for nutritional interventions for PLHIV

• Individual or household food aid identified as a strategy to improve adherence (Bärnighausen et al, 2011; Thompson et al, 2012 – IAPAC)

• WHO recommends nutritional assessment, and dietary counseling, education and support, including food aid when appropriate, be a standard part of comprehensive care for HIV
Empirical evidence on effectiveness of food-based interventions for PLHIV is still limited

• Few studies on household food aid and ART adherence
  – Zambia ¹, Mozambique ², Niger ³
  – No studies in Latin America

• We tested the effect of household food aid and nutritional education on adherence in Honduras

Overview of presentation

- Background and motivation
- Intervention and study design
- Results
- Implications
Collaborative study with multiple stakeholders

- RAND Corporation
- UN World Food Program – Office of Latin America and the Caribbean
- Honduran Ministry of Health
- Association of People Living with HIV/AIDS in Honduras (ASONAPVSIDAH)
Formative research in 2008 led to intervention components

- Identified frequently consumed and culturally salient foods
- Collected contextual information about food consumption, availability, and prices
- Assessed nutritional status, micro and macro-nutrient intake, food security, and barriers to adherence
Pilot intervention compared food aid plus nutritional education to nutritional education only

<table>
<thead>
<tr>
<th>Region</th>
<th>Intervention</th>
<th>Control</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Food aid + nutritional education (n=203)</td>
<td>Nutritional education only (n=197)</td>
</tr>
<tr>
<td>Region 1: Tegucigalpa</td>
<td>Clinic 1 (Large) • n = 131</td>
<td>Clinic 2 (Large) • n = 128</td>
</tr>
<tr>
<td>Region 2: Caribbean</td>
<td>Clinic 3 (Small) • n = 72</td>
<td>Clinic 4 (Small) • n = 69</td>
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Hypotheses

• Information-Motivation-Behavioral Skills (IMB) Model $\rightarrow$ nutrition education should improve ART adherence

• Household food aid should additionally improve adherence by easing household resource constraints
Nutritional education

- Led by trained nutritionists
- Monthly 1-on-1 counseling sessions
- Monthly group education sessions
Household food aid

• Supplemental household ration, standardized for family of 5
• Monthly pick-up
• Contents follow WFP policies: maize, rice, beans, corn-soy blend, vegetable oil
Study participants

• Inclusion criteria
  – 18 years or older and local resident
  – Receiving ART for at least 6 months with indications of suboptimal adherence
  – Underweight and/or with household food insecurity
Multiple measures for adherence assessed at baseline, 6 and 12 months

• Two objective measures:
  – Delayed pharmacy refill of ARVs in last 6 months (binary)
  – Missed scheduled clinic appointment in last 6 months (binary)

• One self-reported measure:
  – Missed ARV doses in the past month (binary)
Analysis

- Outcome variables → 3 measures of adherence
- Linear probability model, adjusted for potential confounders
- Generalized estimating equations for correlated repeated measurements
- Attrition weights
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Participants characteristics

• 400 participants recruited at baseline
• Most were women (69%); moderately or severely food insecure (84%); one-third were overweight or obese
• Groups differed on SES variables
• 82% of participants completed study
Baseline adherence differed between groups

<table>
<thead>
<tr>
<th></th>
<th>Food basket + Nutrition education (n=203)</th>
<th>Nutrition education only (n=197)</th>
<th>All (n=400)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Missed appointment, %</td>
<td>65.2†</td>
<td>55.9†</td>
<td>60.6</td>
</tr>
<tr>
<td>Delayed pharmacy refills, %</td>
<td>63.8**</td>
<td>36.4**</td>
<td>50.4</td>
</tr>
<tr>
<td>Missed ART doses %</td>
<td>41.0</td>
<td>45.4</td>
<td>43.0</td>
</tr>
</tbody>
</table>

** p < 0.01; * p < 0.05; † p < 0.10
Unadjusted trends suggest improved adherence for both study groups

Missed appointments

Self-reported missed doses

Delayed pharmacy refills
**Food basket associated with improved pharmacy refills only**

<table>
<thead>
<tr>
<th></th>
<th>Missed appointment</th>
<th>Delayed pharmacy refills</th>
<th>Self-reported missed doses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coef (SE)</td>
<td>Coef (SE)</td>
<td>Coef (SE)</td>
</tr>
<tr>
<td><strong>Month 6</strong></td>
<td>-0.380**</td>
<td>-0.221**</td>
<td>-0.344**</td>
</tr>
<tr>
<td></td>
<td>(0.044)</td>
<td>(0.048)</td>
<td>(0.053)</td>
</tr>
<tr>
<td><strong>Month 12</strong></td>
<td>-0.504**</td>
<td>-0.325**</td>
<td>-0.414**</td>
</tr>
<tr>
<td></td>
<td>(0.039)</td>
<td>(0.040)</td>
<td>(0.047)</td>
</tr>
<tr>
<td><strong>Food basket X Month 6</strong></td>
<td>-0.046</td>
<td>-0.196**</td>
<td>0.005</td>
</tr>
<tr>
<td></td>
<td>(0.060)</td>
<td>(0.062)</td>
<td>(0.066)</td>
</tr>
<tr>
<td><strong>Food basket X Month 12</strong></td>
<td>0.012</td>
<td>-0.111‡</td>
<td>0.050</td>
</tr>
<tr>
<td></td>
<td>(0.060)</td>
<td>(0.059)</td>
<td>(0.063)</td>
</tr>
</tbody>
</table>

**p < 0.01; * p < 0.05; ‡ p < 0.10**

Covariates: Receipt of food basket, age, gender, education, work status, presence of HIV symptoms, presence of children under age 18 in HH, food insecurity, body mass index, economic support from family/friends, depression, and month-of-interview indicators to control for seasonality.
Overview of presentation

• Background and motivation
• Intervention and study design
• Results
• Implications
Food aid may have positive - but limited - effects on adherence

• Group receiving food aid plus nutrition education had a 20% larger reduction in pharmacy refill delays than the group receiving nutrition education only

• No additional effect of food aid on probability of missed appointments or self-reported missed doses
Nutritional education may improve adherence but needs to be formally tested

• All three indicators of adherence improved significantly among both groups receiving nutritional education

• Unlike food aid, the nutritional education was closely tailored to the local culture and food environment
Our results should be taken as preliminary

- Small number of clinics
  - Limited ability to account for correlation between individuals in clinics
  - Randomization did not produce statistically comparable groups. May have omitted variables bias
- Outcome measures capture treatment adherence broadly, but are not direct measures of medication adherence
Few interventions address structural barriers to adherence and HIV outcomes in Latin America

- Latin America has a unique context:
  - Low HIV prevalence, concentrated in marginalized groups
  - Extremely high social and economic inequality
  - High prevalence of overweight and obesity coinciding with food insecurity

- We provide context specific evidence that nutritional interventions can improve adherence in this setting, but more needs to be done
Optimal food security interventions for PLHIV still need to be determined

• Sustainability of direct food aid is an issue
  – Determine timing, targeting, and contents to assist people in most need
• Consider alternate modalities (e.g. cash, vouchers)
• Consider interventions to address upstream causes of food insecurity (e.g. income generation, social protection policies, etc.)
Thank you!